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Medical Force Protection: Paraguay

Medical Force Protection countermeasures required before, during, and after deployment to Ecuador are as follows:

Major Threats

Diarrheal disease, viral hepatitis A, typhoid and paratyphoid fever, malaria, dengue fever, Venezuelan Equine Encephalitis, leishmaniasis, sexually transmitted diseases, rabies (primarily from stray dogs), heat injury, industrial pollution, and altitude sickness (central region).
Presume local water sources are not safe for drinking.

Requirements before Deployment

1. **Before Deploying report to Medical to:**
   a. Ensure your Immunizations are up to date, specific immunizations needed for area: **Hepatitis A, MMR, Typhoid, Yellow fever, Tetanus (Td), and Influenza.**
   b. If you have not been immunized against Hepatitis A (two dose series over 6 months) get an injection of Immunoglobulin with the initial Hepatitis A dose.
2. **Malaria Chemoprophylaxis**: Risk in 3 departments: Alto Parana, Caaguazu, and Canendiyu. Drug resistant strains are present in some locales (chloroquine and possibly Fansidar).

   Recommended regimen: Mefloquine 250mg per week begun 2 weeks prior to entering country and continued weekly until 4 weeks after return from country.

   Personnel in flight status: Doxycycline 100mg per day begun 2 days before entering country. Continue daily while in country and until 28 days after return.

   Terminal prophylaxis (for both chemoprophylaxis regimens)**: Primaquine 15 mg per day** for 14 days starting on day of departure from country of risk. **G6PD status must be determined prior to starting Primaquine.**

3. **Get HIV testing if not done in the past 12 months.**
4. **Complete attached Pre-Deployment Screening form and turn into your Medical Section.**
5. **Make sure you have or are issued from unit supply: DEET, permethrin, bednets/poles, sunscreen and lip balm. Treat utility uniform and bednet with permethrin.**

Requirements during Deployment

1. Consume food, water, and ice only from US-approved sources; **"Boil it, cook it, peel it, or forget it"**.
2. Involve preventive medicine personnel with troop campsite selection.
3. Practice good personal hygiene, hand-washing, and waste disposal.
4. Avoid sexual contact. If sexually active, use condoms.
5. Use DEET and other personal protective measures against insects and other arthropod-borne diseases. Personal protective measures include but are not limited to proper wear of uniform, use of bed nets, and daily "buddy checks" in tick and mite infested areas.
6. Continue malaria chemoprophylaxis.
7. Minimize non-battle injuries by ensuring safety measures are followed. Precautions include hearing and eye protection, enough water consumption, suitable work/rest cycles, and acclimatization to environment and stress management.
8. Eliminate food/waste sources that attract pests in living areas.
9. Avoid contact with animals and hazardous plants.
10. Consider **Acetazolamide (Diamox) 250 mg every 6 – 12 hours** for 1 – 2 days before ascent and continued for 48 hours **if traveling to elevations >2,500 meters** .

Requirements after Deployment

1. Continue malaria chemoprophylaxis.
2. Begin terminal malaria prophylaxis as described above.
3. Receive preventive medicine debriefing after deployment.
4. Seek medical care immediately if ill, especially with fever.
5. Get HIV and PPD testing as required by your medical department or Task Force Surgeon.

PARAGUAY
VECTOR RISK ASSESSMENT PROFILE
(VECTRAP)

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1. GEOGRAPHY: **Area** of 406,750 sq.km. (157,047 sq.mi.), or about the size of California. ***Capital City*** is Asuncion (pop 700,000). The **Terrain** east of the Paraguay river consists of grassy plains, wooded hills, and tropical forests. West of the Paraguay river (Chaco region) is a low, flat, marshy plain. **Climate** - Temperate east of the Paraguay river, semiarid to the west.

2. VECTOR-BORNE DISEASES:

a. **Malaria**: *Plasmodium vivax* and *P. falciparum* are present country-wide. The incidence of malaria is highest along the southeastern border with Brazil. Risk is greatest October through May; primarily in the rural regions of Alto Parana (accounts for about 90 percent of all cases), Amambay, and Canendiyu Departments along the southeastern border with Brazil. Urban areas in these departments and the Iguassu Falls vicinity are risk-free. Reported annual case totals declined from more than 4,500 during 1985 to less than 2,900 during 1988. Incidence reportedly increased during 1989, but data are not available. Most malaria cases occur among migrant laborers and Indians in rural areas. *Plasmodium vivax* accounts for 94 to 99.5 percent of all indigenous cases, and the Ministry of Health has attributed almost all falciparum malaria cases to importation. However, outbreaks attributed to falciparum malaria occurred in extreme eastern Paraguay (Alto Parana and Canendiyu Departments) during early 1989 and 1990. Although chloroquine and Fansidar-resistant strains of *P. falciparum* occur in neighboring Brazil, none have been confirmed from Paraguay. The risk of acquiring malaria is considered high without the proper chemoprophylaxis and would result in a serious loss of combat effectiveness.

b. **Dengue fever**: Several thousand cases of Dengue Fever were reported in 1989; no fatalities were reported. Risk of outbreaks exists during warmer months (November through April), primarily in urban areas where the vector population is highest. An outbreak caused by dengue virus serotype 1 occurred in the Asuncion area in early 1989, with nearly 39,000 cases of dengue fever reported through April. No fatalities were reported, indicating that no dengue hemorrhagic fever or dengue shock syndrome had occurred. The vector mosquito, *Ae. aegypti*, is present throughout the region. Although dengue fever cases have not been reported since early 1989, dengue fever virus may have been circulating at low levels during 1990. If contracted, Dengue Fever would seriously reduce combat effectiveness. The Institute of Tropical Medicine of Assuncion, Paraguay, confirmed 11,600 clinical cases of dengue have been registered in Assuncion alone as of March, 2000. The estimates are that the total for the whole country is more than 100,000. Ciudad del Este (the city across the Iguassu Falls from Brazil) with around 30,000 cases, is the most affected.

c. **Leishmaniasis**: Leishmaniasis is most prevalent in the southeastern half of the country where both cutaneous and mucocutaneous forms are found. It is highly endemic in rural foci in Alto Parana, Amambay, Caaguazu, Caazapa, Canendiyu, Guaira, and San Pedro Departments. Over 90 percent of cases are reported from the east central Departments of Caaguazu, Canendiyu, and San Pedro. Strains of *Leishmania braziliensis*

are the causative agents for nearly all cases of leishmaniasis in Paraguay (*L. amazonensis* reportedly has been detected in the extreme northeast). About 75 percent of the reported leishmaniasis cases are cutaneous, with the remainder mucocutaneous. Recent annual case totals varying from 103 to over 1,300 presumably underestimate actual incidence. (Annual incidence in rural Caaguazu Department reportedly is about 52 cases per 100,000 population.)

d. **Chagas' Disease**: It is found country-wide. It is endemic in nearly all rural areas. Concepcion, San Pedro, Cordillera, and Paraguari Departments have the highest overall seroprevalence, with 20 per cent of the tested population seropositive for the etiological agent, *Trypanosoma cruzi.* In some areas of the Gran Chaco, seroprevalence may reach 80 percent. The risk of acquiring this disease is high.

e. **Endemic Typhus**, **Filariasis** and **Plague** are present at low levels of endemicity. The risk of acquiring one of these diseases is considered low. Of these, plague and endemic typhus would significantly reduce combat effectiveness.

3. DISEASE VECTOR INFORMATION:

a. The principal vectors for malaria in Paraguay are the mosquitoes *Anopheles darlingi* and *An. albitarsis*. The primary vector species is *An. darlingi*, an indoor feeder whose larvae usually are found in shaded bodies of water, including swampy areas and grassy edges of streams and pools.

b. The reduviid bugs, *Triatoma infestans* and *Panstrongylus megistus*, are the vectors for Chagas' Disease.

c. The flea, *Xenopsylla cheopis*, is the principal vector for endemic typhus and plague.

d. The sand flies, *Lutzomyia* species, are the vectors of leishmaniasis. Most sand flies are active between dusk and dawn, and have very limited flight ranges. Vector (reportedly *Lu. intermedia*) populations are associated with heavily wooded areas, particularly river basins where humidity is high and air circulation is limited.

4. DISEASE AND VECTOR CONTROL PROGRAMS:

a. Prevention & Control: Malaria chemoprophylaxis should be mandatory. Consult the Navy Environmental Preventive Medicine Unit #2 in Norfolk, VA (COMM: 757-444-7671; DSN: 564-7671; FAX: 757-444-1191; PLAD: NAVENPVNTMEDU TWO NORFOLK VA) for the current chemoprophylaxis recommendations.

b. Yellow fever immunizations should be current.

c. The conscientious use of personal protective measures will help to reduce the risk of many vector-borne diseases. The most important personal protection measures include the use of DEET insect repellent on exposed skin, wearing permethrin-treated uniforms, and wearing these uniforms properly. The use of DEET 33% lotion (2 oz. tubes: NSN 6840-01-284-3982) during daylight and evening/night hours is recommended for protection against a variety of arthropods including mosquitoes, sand flies, other biting flies, fleas, ticks and mites. Uniforms should be treated with 0.5% permethrin aerosol clothing repellent (NSN 6840-01-278-1336), per label instructions. NOTE: This spray is only to be applied to trousers and blouse, <u>not</u> to socks, undergarments or covers. Reducing exposed skin (e.g., rolling shirt sleeves down, buttoning collar of blouse, blousing trousers) will provide fewer opportunities for blood-feeding insects and other arthropods. Additional protection from mosquitoes and other biting flies can be accomplished by the use of screened eating and sleeping quarters, and by limiting the amount of outside activity during the evening/night hours when possible.

Bednets (insect bar [netting]: NSN 7210-00-266-9736) may be treated with permethrin for additional protection.

d. The most important element of an *Aedes aegypti* control program is SOURCE REDUCTION. Eliminating or covering all water holding containers in areas close to human habitation will greatly reduce *A. aegypti* populations. Alternatively, containers may be emptied of water at least once a week to interrupt mosquito breeding. Sand or mortar can be used to fill tree holes and rock holes near encampments.

e. Because the breeding habitats of most sand fly species are not easily identified, not easily accessible, or unknown, control strategies focus mainly on adult sand flies. Peridomestic sand fly species can be controlled by spraying residual insecticides on buildings (including screening on portals of entry) animal shelters, and other adult resting sites. Area chemical control of sylvan sand fly species is impractical. Personal protective measures will reduce sand fly bites and environmental modification (e.g., clearing forests, eliminating rodent burrows/breeding sites, relocating domestic animals away from human dwellings) has been used to reduce local sand fly populations.

f. Expanded Vector Control Recommendations are available upon request.

5. IMPORTANT REFERENCES:

Contingency Pest Management Pocket Guide - Fourth Edition. Technical Information Memorandum (TIM) 24. Available from the Defense Pest Management Information Analysis Center (DPMIAC) (DSN: 295-7479 COMM: (301) 295-7479). Best source for information on vector control equipment, supplies, and use in contingency situations.

Control of Communicable Diseases Manual - Sixteenth Edition. 1995. Edited by A. S. Benenson. Available to government agencies through the Government Printing Office. Published by the American Public Health Association. Excellent source of information on communicable diseases.

Medical Environmental Disease Intelligence and Countermeasures - (MEDIC). September 1997. Available on CD-ROM from Armed Forces Medical Intelligence Center, Fort Detrick, Frederick, MD 21702-5004. A comprehensive medical intelligence product that includes portions of the references listed above and a wealth of additional preventive medicine information.

Internet Sites- Additional information regarding the current status of vector-borne diseases in this and other countries may be found by subscribing to various medical information sites on the internet. At the Centers of Disease Control and Prevention home page subscriptions can be made to the Morbidity and Mortality Weekly Report(MMWR)and the Journal of Emerging Infectious Diseases. The address is www.cdc.gov. The World Health Organization Weekly Epidemiology Report (WHO-WER) can be subscribed to at www.who.int/wer. The web site for PROMED is www.promedmail.org:8080/promed/promed.folder.home.
Although PROMED is not peer reviewed, it is timely and contains potentially useful information. The CDC and WHO reports are peer reviewed. Information on venomous arthropods such as scorpions and spiders as well as snakes, fish and other land animals can be found at the International Venom and Toxin Database website at www.uq.edu.au/~ddbfry/. Information on anti-venom sources can also be found at that site. Information on Poisonings, Bites and Envenomization as well as poison control resources can be found at www.invivo.net/bg/poison2.html.